The CVT Overhaul Pack

Diagnose it, measure everything that comes out, and record what goes back in. Four sheets for the system that wears fastest.

Diagnose it, measure everything that comes out, record what goes back in. Four sheets for the system that wears fastest and gets documented least.

PRINT THIS AT ACTUAL SIZE

Several sheets in this pack carry scales, rings and bars printed at true size that you lay a part against. Those are only correct if the pack is printed at 100%. In the print dialog choose “Actual size” or “100%”, not “Fit to page”. Each sheet that needs it carries its own millimetre rule — check one with a steel rule before you trust any dimension in the pack.

WHAT IS IN THIS PACK

MEASURE THE OLD PARTS BEFORE THEY GO IN THE BIN

This is the one instruction that matters more than any other in the pack. A worn belt and a set of flattened rollers are the only physical record of how the machine was set up and how fast it wears. Once they are in the bin that information is gone, and the next service starts from a guess again.

FREE TO PRINT, COPY AND PASS ON

This pack costs nothing and always will. Print it, photocopy it, hand it to somebody in a club or a forum, leave a copy in a workshop. If you find a mistake in it, tell us and it gets corrected — every sheet carries a document number and a version so you can say exactly which one you mean.

CVT SLIPPING, JUDDER AND SQUEAL

BEFORE YOU START

Petrol vapour ignites, batteries produce hydrogen, ignition coils carry thousands of volts and a machine on a stand can fall. Work outdoors or with the door open, disconnect the battery before probing wiring you are not deliberately measuring live, and never run an engine in a closed space. This sheet helps you observe and record. It is not a repair manual and it does not know your machine.

FIRST — WHAT EXACTLY IS IT DOING?

Three symptoms from one case, and they do not mean the same thing

WHAT YOU NOTICE	WHAT THAT POINTS AT
Judder pulsing in time with engine speed as you pull away	The clutch grabbing and releasing rather than taking up smoothly
Revs flare from a standstill without the machine moving	Slip at the clutch, or a belt too worn to grip the pulley faces
Revs climb at speed while the machine does not	Belt slipping in the pulleys rather than clutch slip
Steady squeal, especially under load or uphill from a stop	Friction where there should be grip — record when exactly it happens
A rattle at low speed that disappears as you accelerate	Rollers moving in their track rather than being held out

FROM STANDSTILL, AT SPEED, OR BOTH?

ONLY UNDER LOAD OR UPHILL?

MILES SINCE THE CVT WAS LAST OPENED

WITH THE COVER OFF — IN THIS ORDER

LOOK BEFORE YOU TOUCH ANYTHING

- [ ] Loose black dust coating the inside of the case
  A light film is normal, a coating is not
- [ ] Any oil or grease at all inside the case

THE BELT

- [ ] Cracks running across the cogs on the inner face
- [ ] Sides glazed and shiny rather than matt
- [ ] Edges worn to a sharp taper instead of a square shoulder
- [ ] Frayed or missing cogs anywhere along its length
- [ ] At rest, does the belt sit level with the outer edge of the pulley, or below it?

THE CLUTCH

- [ ] Friction faces shiny and glazed rather than matt
- [ ] Friction material remaining, and even across all shoes

- [ ] Spring holes in the shoes round, or worn oval
- [ ] Clutch bell scored, blued from heat, or worn oval

THE VARIATOR SIDE

- [ ] Rollers: any flat facet rather than a full circle
- [ ] Rollers all the same diameter as each other
- [ ] Ramp plate and sliders present, unworn, not notched
- [ ] Pulley faces scored, stepped or grooved where the belt runs

OIL IN A DRY CASE IS THE FINDING, NOT THE MESS

DO NOT FIT A NEW BELT INTO A CONTAMINATED CASE

The transmission runs dry by design. Oil or grease inside it means a crankshaft seal, a gearbox seal or an over-greased bearing is leaking into it. A belt that has been contaminated will keep slipping however new it is, and a replacement fitted before the leak is found will be glazed within weeks. Find the source first — the sheet below records where you found it.

OIL FOUND? WHERE IN THE CASE?	WHICH SIDE IS IT COMING FROM?	BELT CONTAMINATED?

CLEANING, IF YOU DO IT

1. Take the glaze off the friction faces with abrasive paper — the community's own remedy for glazed shoes.
2. Clean everything thoroughly afterwards to remove the dust you have just created, because that dust is what caused the glaze in the first place.
3. Use nothing oily. A residue-leaving cleaner on a friction face undoes the whole job.
4. Do not clean a belt and refit it if it is cracked, frayed or worn narrow. Cleaning does not restore width.

FINDINGS

DATE	MILES	WHAT YOU FOUND	WHAT YOU DID

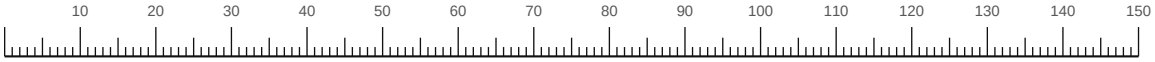
WRITE DOWN WHAT YOU SAW, NOT WHAT YOU CONCLUDED

Every box on this sheet asks for an observation. That is deliberate: the observation is recoverable later and the conclusion is not. “Plug dry after six attempts” is still useful in a month. “Fuel problem” is not, because you will not remember what made you think so.

CVT BELT SIZE CHART AND MEASURING SHEET

A drive belt is described by three numbers, and almost every wrong order comes from reading them in the wrong order or from measuring a belt that is already worn.

PRINT CALIBRATION — CHECK BEFORE MEASURING



Lay a steel rule along this scale. The 150mm mark must fall at exactly 150mm. If it does not, reprint at 100% / “Actual size” with page scaling off — every measurement you take from a scaled sheet will be wrong.

READING THE MARKING ON THE BELT

How a three-number belt marking is conventionally read

FIELD	EXAMPLE	WHAT IT DESCRIBES	HOW TO CHECK IT YOURSELF
First number	743	Outside length in millimetres	Run a string round the outer face of the belt and measure the string
Second number	20	Top width in millimetres	Measure across the wide flat face at its widest point
Third number	30	Angle of the sides in degrees	Compare the taper end-on against a known belt

THIS IS A TRADE CONVENTION, NOT A PUBLISHED STANDARD

Length-width-angle is how sellers, manufacturers and owners consistently use these three numbers, and it is consistent with what is printed on the belts themselves. We have not found a standards document that defines it. Treat it as a reliable reading convention and confirm it against the belt in your hand — which the width bars on this sheet let you do in about ten seconds.

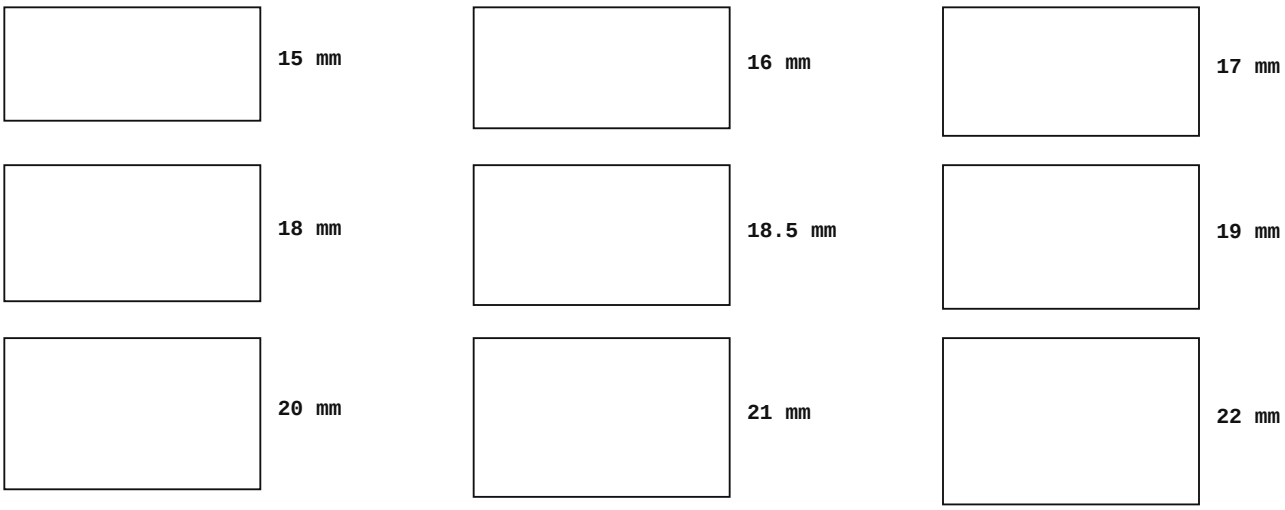
THE MARKING WEARS OFF BEFORE THE BELT DOES

The printed marking sits on the flat outer face, which is the surface that runs against the clutch bell and the pulley faces. On a belt that has done real mileage it is usually the first thing to disappear. If yours is unreadable, measure instead — the next section is for exactly that.

MEASURING A BELT WITH NO READABLE MARKING

1. Lay the belt flat on a bench so it forms an oval, not a figure of eight.
2. Measure the top width — the wide flat face — with calipers, or against the true-size bars below. Take the reading at the widest point you can find, away from any glazed or frayed edge.
3. For length, lay a tape or a length of string round the OUTSIDE face of the belt, pull it snug without stretching the belt, and mark where it meets. Measure the string. That is the outside length.
4. For the angle, look at the belt end-on. Compare the taper against the profiles printed on the CVT belt gauge on the site — this sheet cannot show an angle at true size and a fraction of a degree matters.
5. Record all three below, and record how confident you are in each.

TRUE-SIZE WIDTH BARS — LAY THE BELT ACROSS THESE



Lay the belt flat across the bars and find the one whose height matches the belt's top width. If the belt falls between two bars, record the measurement to the nearest half millimetre rather than rounding to the nearer bar.

YOUR BELT

MARKING PRINTED ON BELT

Copy every character and space exactly

ANGLE IF KNOWN

°

BRAND OR MAKER ON BELT

ANY OTHER NUMBERS ON BELT

DATE MEASURED

WEAR CHECK

A belt that has worn narrow will still fit, and will still slip. Comparing the measured width against the width printed on the belt tells you how much life it has had — and if you have no printed width, comparing against a new belt of the same marking does the same job.

WIDTH PRINTED ON BELT

mm

WIDTH MEASURED NOW

mm

DIFFERENCE

mm

- [ ] Cracks across the ribs on the inside face
- [ ] Glazed, shiny sides
  Suggests slipping
- [ ] Frayed or missing cogs
- [ ] Edges worn to a sharp taper
- [ ] Belt sits below the outer edge of the clutch pulley faces at rest

THE MACHINE IT CAME OFF

MAKE AND MODEL

ENGINE SIZE

cc

ENGINE FAMILY NUMBER

CASE LENGTH IF KNOWN

Crank centre to axle centre

VARIATOR OUTSIDE DIAMETER

mm

CLUTCH BELL INSIDE DIAMETER

mm

NOTES — WHAT THE OLD BELT WAS DOING BEFORE IT WAS REPLACED

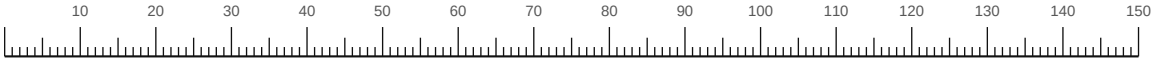
THIS SHEET RECORDS, IT DOES NOT RECOMMEND

Nothing here tells you which part to buy. It tells you what you currently have, in the units a seller works in. Machines built to the same nominal specification were fitted with different components by different suppliers, sometimes inside one model year, so the only reliable reference is the item in your hand.

VARIATOR ROLLER MEASUREMENT SHEET

Rollers are described by two dimensions and a weight. Ordering on weight alone is the commonest mistake, because the same weight is sold in more than one size.

PRINT CALIBRATION — CHECK BEFORE MEASURING



Lay a steel rule along this scale. The 150mm mark must fall at exactly 150mm. If it does not, reprint at 100% / “Actual size” with page scaling off — every measurement you take from a scaled sheet will be wrong.

WHAT THE NUMBERS MEAN

How a roller size is conventionally written

WRITTEN AS	MEANS	MEASURED HOW
`16 × 13`	16mm diameter, 13mm width	Diameter across the round face; width along the axis
`A weight in grams`	Mass of ONE roller, not the set	On a scale reading to 0.1g if you have one
`A set of six`	Six rollers of equal weight	Weigh each — uneven sets are common and are a fault

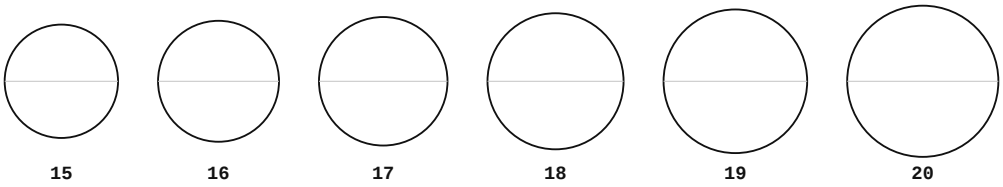
A WORN ROLLER MEASURES SMALLER THAN IT WAS SOLD AS

Rollers wear a flat where they run against the ramp. Measured across that flat, a roller sold as 16mm can read 15.2mm. Always measure across the widest part you can find, and treat the result as a minimum — if it measures 15.6mm it was almost certainly a 16.

MEASURING DIAMETER

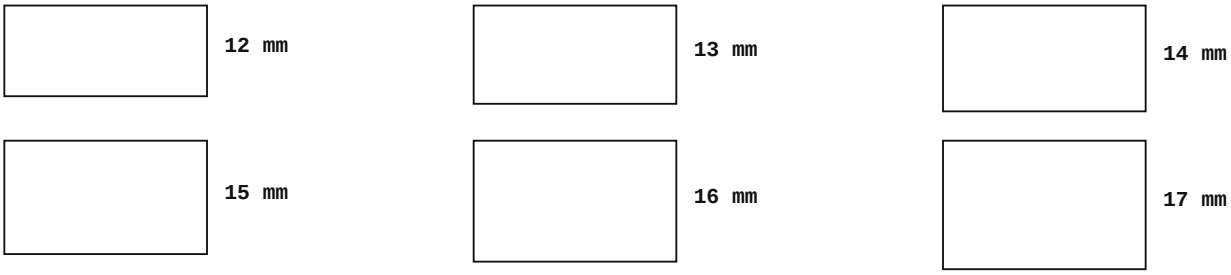
Rollers wear flat on the face that runs against the variator ramp. A worn roller measures smaller across the flat than across the round, so take the measurement across the widest point you can find and treat it as the minimum — the roller was originally at least that size, and probably the next standard size up.

TRUE-SIZE CIRCLES — STAND A ROLLER ON THESE



MEASURING WIDTH

TRUE-SIZE WIDTH BARS — LAY A ROLLER ON ITS SIDE ACROSS THESE



YOUR ROLLERS

Weigh and measure each one separately. Uneven wear across a set is itself a diagnosis: it usually means the rollers have been sticking rather than rolling.

ROLLER	DIAMETER MM	WIDTH MM	WEIGHT G	FLAT SPOT?	MARKINGS ON ROLLER

NUMBER OF ROLLERS FITTED

TOTAL SET WEIGHT g

WEIGHT PER ROLLER AS SOLD g

WEAR INSPECTION

- [ ] Flat spots on any roller
  The roller has been sliding, not rolling
- [ ] Rollers of visibly different diameters in one set
- [ ] Cracked or crumbling outer material
- [ ] Scoring or grooves worn into the variator ramp plate
- [ ] Grease or oil inside the variator
  Something is leaking where it should not
- [ ] Ramp plate sliders worn or missing

THE MACHINE

MAKE AND MODEL

ENGINE SIZE cc

ENGINE FAMILY NUMBER

VARIATOR OUTSIDE DIAMETER mm

BELT MARKING

DATE MEASURED

WHAT YOU WERE TRYING TO CHANGE, AND WHAT HAPPENED

THIS SHEET RECORDS, IT DOES NOT RECOMMEND

Nothing here tells you which part to buy. It tells you what you currently have, in the units a seller works in. Machines built to the same nominal specification were fitted with different components by different suppliers, sometimes inside one model year, so the only reliable reference is the item in your hand.

CVT SERVICE RECORD

Fill the machine block in once. Then one row per service, with the measurements taken before the old parts go in the bin.

THE MACHINE

MAKE AND MODEL	ENGINE FAMILY NUMBER	DISPLACEMENT
		cc

CASE: SHORT OR LONG	CVT COVER BOLT COUNT	VARIATOR OUTSIDE DIA
		mm

SERVICE LOG

DATE	MILES	WHAT WAS REPLACED	PART FITTED — EXACT MARKING	OLD PART MEASURED

BELT RECORD

DATE	MILES AT FITTING	MARKING ON BELT	WIDTH NEW MM	WIDTH AT REMOVAL MM	MILES IT LASTED

THE LAST COLUMN IS WHY THIS SHEET EXISTS
Published belt intervals for these machines vary wildly and none of them is about your machine. Two entries in that column and you have your own figure, which is the only one that accounts for how you ride and what the rest of your transmission is doing.

ROLLER RECORD

DATE	MILES	SIZE FITTED	WEIGHT EACH G	OLD ONES FLAT?	WHY CHANGED

CLUTCH, SPRINGS AND SLIDERS

DATE	MILES	WHAT WAS CHANGED	DESCRIPTION OF THE PART FITTED	EFFECT NOTICED

INSPECT WHILE IT IS OPEN

- [ ] Belt: cracks across the cogs, glazed sides, frayed edges, sharp tapered edges
- [ ] Rollers: flat spots, uneven diameters within one set, crumbling material
- [ ] Ramp plate and sliders: worn, notched or missing
- [ ] Variator faces: scored, stepped or grooved where the belt runs
- [ ] Clutch shoes: material remaining, even wear, no cracking
- [ ] Clutch bell: scored, blued from heat, or worn oval
- [ ] Any oil or grease inside the case
  Something is leaking that should not be
- [ ] Case vent and air duct clear of dust and debris
- [ ] Crankshaft nut and clutch nut torqued and secure

OIL INSIDE THE CVT IS A FINDING, NOT A MESS

The transmission runs dry. Oil or grease inside it means a crankshaft seal, a gearbox seal or an over-greased bearing is leaking into it, and a belt that has been contaminated will keep slipping however new it is. Find the leak before fitting a new belt, or you will be fitting another one shortly.

NOTES